

Decimal Addition

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CONCEPT

1

Decimal Addition

Here you'll learn to add decimals with and without rounding.

Have you ever been on a relay team? Have you ever run a relay race?



Last year, the girl's middle school relay team ran the 4×100 meters in 53.87 and won the regional championship. This year, there are four new girls on the team and they have set a goal of running the 4×100 in a faster time than the girls did the year before.

Jessica is the lead runner on the team. The second runner is Karin. The third runner is Tasha and the fourth runner and fastest runner is Uniqua. All four girls worked and trained hard. They didn't know each prior to making the team, so it took the girls most of the season to get to know each other's strengths and weaknesses. Their coach, Ms. Sutter worked hard to help the girls work through their differences while maintaining a good attitude. Ms. Sutter doesn't put up with a lot of nonsense and all of the runners show respect to her and their team mates.

Because of their hard work, the relay team made it all the way to the Regional championship.

"Just be sure to run your best race," Ms. Sutter told them prior to the start.

All four girls shook hands and prepared to run. Here are their individual times:

Jessica = 13.00

Karin = 14.10

Tasha = 14.23

Uniqua = 12.40

Did the girls accomplish their goal of running the relay faster than the previous team?

This Concept is all about adding decimals. To figure out the total time of the relay team, you will need to know how to add decimals. Finish this Concept and you will be ready!

Guidance

Decimals appear in all aspects of life—any time there is a part of a whole number—from money to measurement to percentages. Meghan finished 0.75 of her homework; Leo ran 1.34 kilometers; the class ate 5.6 pizzas.

You already know how to compare, order, and round decimals.

In this Concept, we will learn how to add them. Once you know how to add decimals, you can apply your knowledge to a whole new dimension of real-world situations, some of which involve algebraic reasoning and equations.

How do we get started when we want to add decimals?

Well, first of all, it all comes back down to place value. To add decimals, we line up the digits according to place value. To keep the place values straight, we always align the decimal points of the decimals.

Remember how you had to add zeros for missing places when you were comparing decimals?

Well, you have to add zeros for missing places when adding decimals too!!

Once we have the decimal points lined up, we add exactly like we add whole numbers—from right to left—taking care to bring the decimal point down into our answer.

$$\begin{array}{r} 1.87 \\ + 2.30 \\ \hline 4.17 \end{array}$$

There are a few things to notice about this problem.

First, the numbers you are adding have been lined up vertically. When you were in elementary school, most of your problems were probably lined up vertically. Now that you are in middle school from now on, you will need to do this step yourself.

Second, you can see that a zero was added to help even out the columns to line up the decimal points. That zero is in red to help you to see that it was added.

$$4.5 + 2.137 = \underline{\hspace{2cm}}$$

To add this problem, let's remember to line up the decimal points and each digit according to place value. Notice that there is one digit after the decimal point in the first number and three in the second number. You will need to add some zeros to help with the addition. Now let's line up the problem.

$$\begin{array}{r} 4.500 \\ + 2.137 \\ \hline 6.637 \end{array}$$

Sometimes, particularly in real-world situations, decimal numbers are just too long to work with. In these cases, to find a quick and workable solution we might round the decimals *before* we add. **For instance, rather than getting bogged down in the ten-millionth place, we can round to the tenth or hundredth place and then add. Look for clues in the problem to tell you whether or not to round before adding. If you are asked to round, make sure you round to the right place!**

Let's look at a problem where rounding would be helpful.

Round each number to the nearest hundredth then find the sum of 9.199, 11.353, 10.648.

This problem asks us to round *before* adding and it asks us to round to the hundredth place. **To make the rounding steps clear, it helps to underline the number you're rounding to and bolding or circling the number directly to**

the right of it. Because we're rounding to the hundredth place, we're going to round to the two places to the right of the decimal place. The bolded number, the thousandths place, is the one you'll look at when deciding to round up or down.

9.199 → rounded to the hundredths place → 9.20

11.353 → rounded to the hundredths place → 11.35

10.648 → rounded to the hundredths place → 10.65

Now that the numbers are rounded, we add zeros, line up the decimal places, and add.

$$\begin{array}{r} 09.20 \\ 11.35 \\ + 10.65 \\ \hline 31.2 \end{array}$$

Our answer is 31.2.

Now it's time to try a few on your own.

Example A

$$4.56 + 1.2 + 37.89 = \underline{\quad}$$

Solution: 43.65

Example B

$$14.2 + 56.78 + 123.4 = \underline{\quad}$$

Solution: 194.38

Example C

$$189.34 + 123.5 + 7.2 = \underline{\quad}$$

Solution: 320.04

Now back to the relay race.



Here is the original problem once again.

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Because of their hard work, the relay team made it all the way to the Regional championship.

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Jessica = 13.00

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Tasha = 14.23

Uniqua = 12.40

Did the girls accomplish their goal of running the relay faster than the previous team?

First, we can write an equation to figure out the time of the race.

$$j + k + t + u < 53.87$$

The girls want to have a time that is less than 53.87. In this way, we are going to be combining comparing decimals and adding decimals.

Next, we fill in the given times for each girl into the equation.

$$13.00 + 14.10 + 14.23 + 12.40 < 53.87$$

Now, we can line up the decimal point to add the values.

$$\begin{array}{r}
 13.00 \\
 14.10 \\
 14.23 \\
 + 12.40 \\
 \hline
 53.73
 \end{array}$$

The time of the relay is 53.73.

Now we can compare this with the previous team's time.

53.73 < 53.87

This is a true statement. The girls have beaten the previous relay team's time. They also achieved a medal at the Regional Championship!!



Vocabulary

Here are the vocabulary words in this Concept.

Decimal a part of a whole represented by digits to the right of a decimal point.

Estimate to find an approximate solution to a problem.

Rounding a method of estimating where you rewrite a decimal or whole number according to the place value that it is closest to.

Guided Practice

Here is one for you to try on your own.

Round each value to the nearest tenth and then find the sum.

4.56, 3.47, 2.04, 6.21

Answer

First, we round each to the nearest tenth.

$$4.56 = 4.6$$

$$3.47 = 3.5$$

$$2.04 = 2.0$$

$$6.21 = 6.2$$

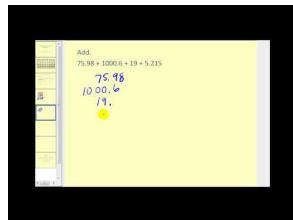
Now we add them up to find the sum.

$$16.3$$

This is our answer.

Video Review

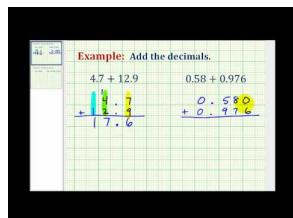
Here are videos for review.



MEDIA

Click image to the left for more content.

- This is a James Sousa video on adding and subtracting decimals.



MEDIA

Click image to the left for more content.

- This is a James Sousa video on adding decimals.

Practice

Directions: Find each sum.

1. $29.451 + 711.36$
2. $0.956 + 0.9885$
3. $13.69 + 42.23$
4. $58.744 + 12.06 + 8.8$
5. $67.90 + 1.2 + 3.456$

Directions: Round to the nearest tenth, then find the sum.

6. $88.95 + 23.451$

7. $690.026 + 831.163$

8. $3.27 + 7.818$

9. $.99 + .909 + .048$

10. $5.67 + 3.45 + 1.23$

Directions: Round to the nearest hundredth, then find the sum.

11. $511.51109 + 99.0986$

12. $.744 + 7.005 + .7071$

13. $32.368 + 303.409$

14. $1.0262 + 1.0242$

15. $1.309 + 3.4590$